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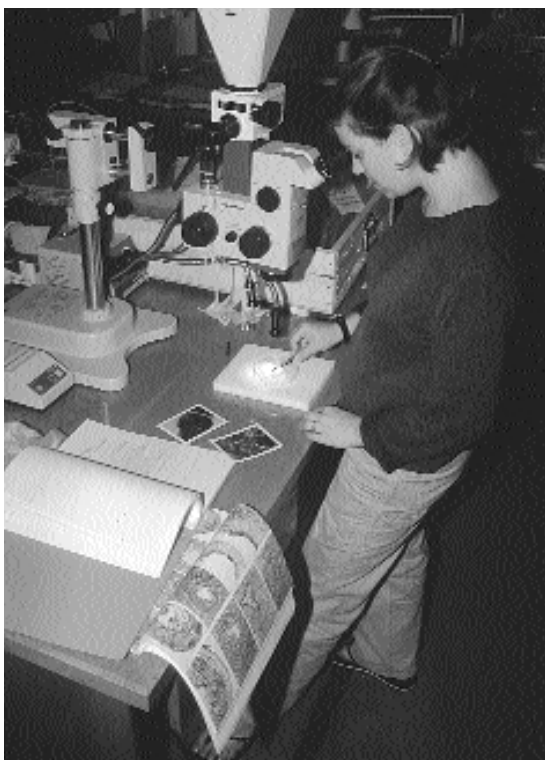
Conservation and Materials Identification in the Field

A Maryland Case Study

Any archeologist can tell you that the scarcest commodity in any project is time in the field. It stands to reason, then, that timely identification of critical materials found during excavation is well worth the expense, since it can have a direct impact on the interpretation of past activities at the site, direction of the digging, and the focus of resources.

The modern academic-trained conservator, with grounding in chemistry, art, physics, and material sciences, has training in instrumental analysis, photo-documentation, and microscopic examination. Conservators also have a whole suite of manual and artistic skills and their hallmark attention to detail. Armed with a few simple tools common to most labs and many field schools, conservators can bring these skills to any field project, and make a valuable contribution.



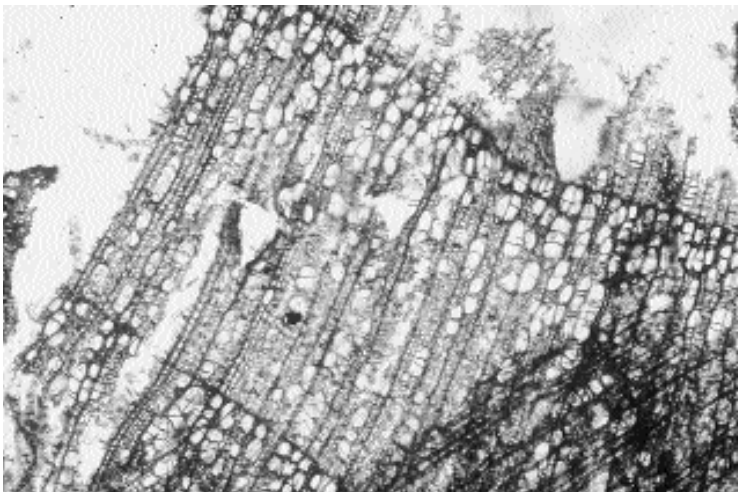
Identifying charcoal samples using a reflected light stereomicroscope. Note the photographic attachment for documenting features, and the reference materials to aid identification.

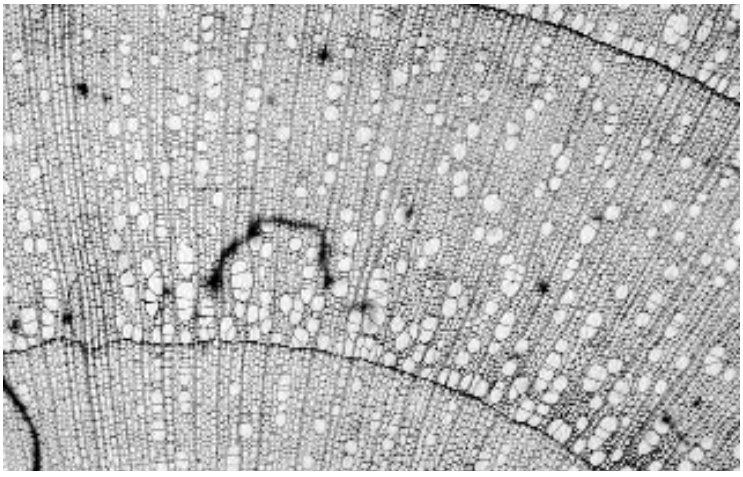
One major contribution can be the examination and identification of excavated materials on site. For example, different metals and their alloys can be identified by means of their corrosion products, specific gravity, or chemical reactivity. This requires only simple microscopy, or a sensitive balance, or a small kit of reagents. The potential benefits are great: determining the level of a culture's metallurgical sophistication or identifying conservation issues before they become problems (and artifacts are lost to poor handling and tardy treatment). Organic materials can also be identified; the animal from which a fragment of leather came can be identified with low-power microscopy. Since different leathers are used for different purposes, this could have bearing on the interpretation of site use, understanding husbandry practices, and past environmental conditions.

This article, however, will focus on the identification of wood species from archeological samples, and the contribution of this specialized skill to archeological fieldwork. Wood is one of the most widely used materials throughout history. It can typify the environment in which humans lived and worked. It is used to make household items, tools, shelters, and transport. As fuel, it is used for cooking, home heating, or in industrial processes. Some trees provide necessities other than wood: seeds, nuts, and fruits for the sustenance of humans and livestock, bark or leaf fibers for textiles, and cordage. Resins are used for incense, coatings, adhesives, and sealants. And the internal structure of wood contains information about changing environmental conditions and the passage of time. The identification and examination of wood samples in the field, therefore, can make significant and timely contributions to the interpretation of the site.

Wood Structure and Identification

Wood has a structure that is heterogeneous in three dimensions, and this structure is signifi-





*Comparison of a degraded archeological sample (top) to a reference sample of alder (*alnus spp*).*

cantly different between individual genus and species of tree. This means that with at least one, and more often two or three views of a sample, the genus and species of wood can be determined.

The detail (genus or species) to which a sample is identified may be justified by the information needed. Family or genus identification may be enough to describe the environment in which the tree was growing (temperate conditions favor different trees over tropical or sub-arctic climates) and annual temperatures and rainfall can affect the width of annular rings, leaving a permanent record of climatic trends. On the other hand, specific species of wood were preferred for different technologies, e.g., shipbuilding versus food bowls. Analysis of the variety of woods found at a site can determine the use to which they were put (e.g., ash or maple shavings might suggest small item manufacture; oak shavings might suggest larger, sturdier items like barrels or structures), or may determine the use of a piece within a larger structure (e.g., the hull planking of a ship might be made of oak and the deck planking of teak). The presence of exotic species could also have implications of trade, since some woods are highly valued for their strength, weather resistance, or their appearance when used in decorative arts. Samples of wood or charcoal that are intended for dendrochronological analysis should also be identified as minutely as possible, since not all woods are suitable. Many dendrochronological records (particularly in Europe and the Mediterranean region) are derived from oak, and cannot be easily compared to other species of wood. Proper identification before submitting them for analysis can save both time and money.

While some wood can be identified directly from the artifact, removing samples is necessary for precise identification, and for high magnification viewing. This is a destructive process, since the samples cannot be replaced. With freshly cut or worked wood, the macroscopic and low-magnification (x2-10) features (annular rings and vessel groups) can be enough to determine genus, and sometimes species of some distinctive woods. Other important macroscopic features may also include the color and odor of the wood. Unfortunately, archeological samples often are obscured and decayed, and these features, especially color and odor, cannot be used easily. Good references or reference collections are crucial, since decayed wood can differ significantly from new wood, obscuring critical features.

Case Study

Recent Phase II excavations at the Old Chapel Field sites in St Mary's County, Maryland (18ST233 and 18ST329), found direct evidence to identify this location as the site of one of the first Jesuit missions in Maryland.[1] One of the features investigated was the cellar of a late-17th- to early-18th-century structure. Among the diag-

nostic artifacts were two fragments of building timbers—a post and a sill.

The wood samples from Old Chapel Field were brought to the Maryland Archaeological Conservation Laboratory, which was both "home" for the archeological team and the ultimate repository of the artifacts recovered. There, the wood was identified by thin-section microscopy as one of the species of southern yellow pine, known variously as loblolly, shortleaf, longleaf, slash, and pitchpine.

The architecture of Chesapeake farmsteads is increasingly well documented, and the settlers themselves left clear descriptions of what building styles and materials survived best in this semi-tropical climate (Carson, et al. 1981; Stone, 1982; Stone, et al. 2000). Vernacular architecture developed in response to the poor survival rate of traditional English framed houses that succumbed quickly to rot and termites. Additionally, the settlers' tool kits helped determine the wood used, as different woods are easier to work with different tools.

Despite its common use today, pine was not a favored wood for construction in Colonial America. The high resin content made pit-sawing extremely difficult as compared with poplar, and it did not shape well by splitting or ax-shaping as compared with oak. As a softwood, it was easily destroyed by rot and termites when left in contact with the ground, compared with chestnut, black locust or cedar (also a softwood, but with particular rot resistant properties still valued today). To find pine in use as both post and sill has several consequences.

The vernacular architecture in the Chesapeake area often relied on heavy posts, rather than earthfast sills, to support the rest of the structure. Any sill will rot quickly in contact with the earth, and posts relied on their larger volume (but smaller surface area) to increase their life span. The presence of pine in both post and sill strongly suggests that this was a cheaper, more expendable structure. Even if the building had dated from the post-Revolutionary period when mill-sawn pine was more common as a building material, pine as an earthfast member still suggests that "the builder was not thinking of a very permanent solution...a rare, but not unheard of occurrence."[2]

The identification of the wood helps to confirm the archeological interpretation of this building as an impermanent structure. It also adds to the growing body of information about architecture and building styles in the late colonial period of Maryland's history.

Conclusion

Wood identification is only one of many conservation procedures that can be easily transferred to a field project. For quick diagnostic purposes, basic laboratory tools like balances, microscopes, and simple chemistry can be used to examine, identify, and interpret many artifacts. Conservators, trained to be multi-faceted with the experience and practice in performing precise, delicate tasks, can be crucial to enhancing the data recovered during those all-too-short field seasons.

Notes

1 Julia King, personal communication, 2001.

2 Willie Graham, personal communication, 2001.

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Photos by the author.